

SCIENCE

And Technology Program



Theme Area: Water Resources

Program Area: Watershed and River Systems Management Program

Project No.: WR00.02

Project Title: ET LIDAR Water Consumptive Use Measurements

Principal Investigator: Steve Hansen, e-mail: shansen@uc.usbr.gov

Co-Principal Investigators: Curt Hartzell and Al Brower

Abstract: This research addresses the evaporation problem along the Rio Grande Basin that needs to be estimated for input to the Upper Rio Grande Water Operations Model (URGWOM). Evaporation is difficult to measure and estimate with reasonable accuracy. A consortium of groups and programs can solve the measurement problem by utilizing a unique combination of tools and techniques that has been made operational through Reclamation's Albuquerque Area Office. This consortium consists of the Bureau of Reclamation, Los Alamos National Laboratory, New Mexico State University, Utah State University, and the University of Iowa. In addition to these groups, the USDA SALSA (Semi Arid Land Surface Atmosphere) program, and the Bosque del Apache National Wildlife Refuge are also contributing partners in this consortium. The consortium brings together new and improved instrumentation to map the underlying variables associated with the evaporation process including a high resolution water vapor LIDAR, a high resolution airborne thermal scanner, three dimensional sonic anemometry and eddy correlation instruments. These instruments are used to measure the atmospheric variables involved in evaporation with spatial as well as temporal resolution. The data collected from these platforms are converted into energy and water budgets using a data integration model that relies on fundamental spatial turbulence theory. Integrating the large data sets from this new instrumentation is an innovative software package, the ET Toolbox (reference Project No. WR.99.43), that combines processed data into a geographical framework for use by watershed and river resources managers. With these tools, techniques and software (ET Toolbox and RiverWare) the question of open water, wet sand, and reservoir evaporation can be directly addressed. Other agencies participating or cooperating in the URGWOM effort are the University of New Mexico, US Army Corps of Engineers, US Geological Survey, US Fish and Wildlife Service, Bureau of Indian Affairs, and the International Boundary and Water Commission (US Section).

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